Rocky Mountain Spotted Fever,
A Community Intervention

By

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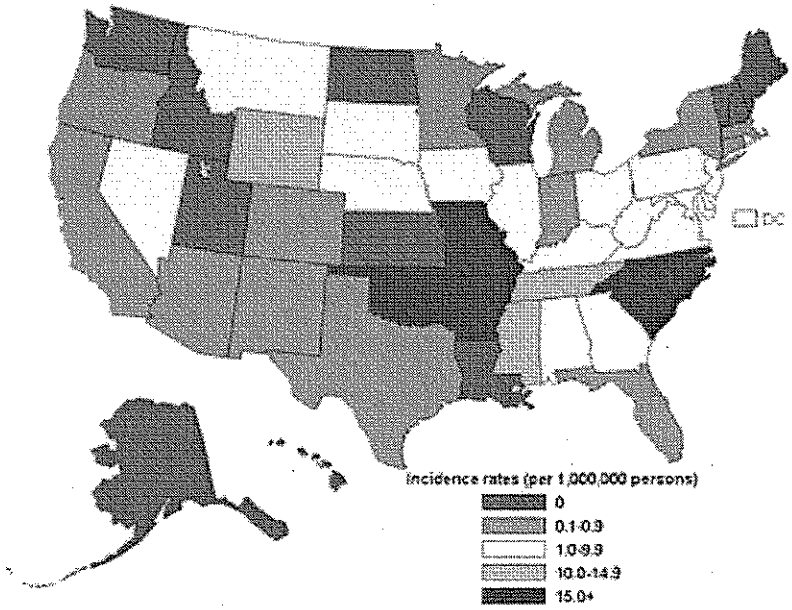
Abstract

Rocky Mountain Spotted Fever is the most severe and most frequently reported tick related illness in the United States. It also occurs in Mexico and in Central and South America. The disease is caused by *Rickettsia rickettsii*, a species of bacteria that is spread to humans via the bite of ixodid (hard) ticks. Initial signs and symptoms of the disease include sudden onset of fever, headache, and muscle pain, followed by development of rash. The disease can be difficult to diagnose in the early stages, and without prompt and appropriate treatment it can be fatal[1]. The following paper describes a community intervention in response to two deaths and multiple cases of Rocky Mountain Spotted Fever (RMSF) experienced by Tribal members residing on a Native American reservation located in the Southwestern United States.

Introduction

Geographically, RMSF is a tick-borne disease commonly found in Southeastern, Midwest, and Northwestern regions of the United States[2]. The disease, RMSF, is rarely found in the State of Arizona[3].



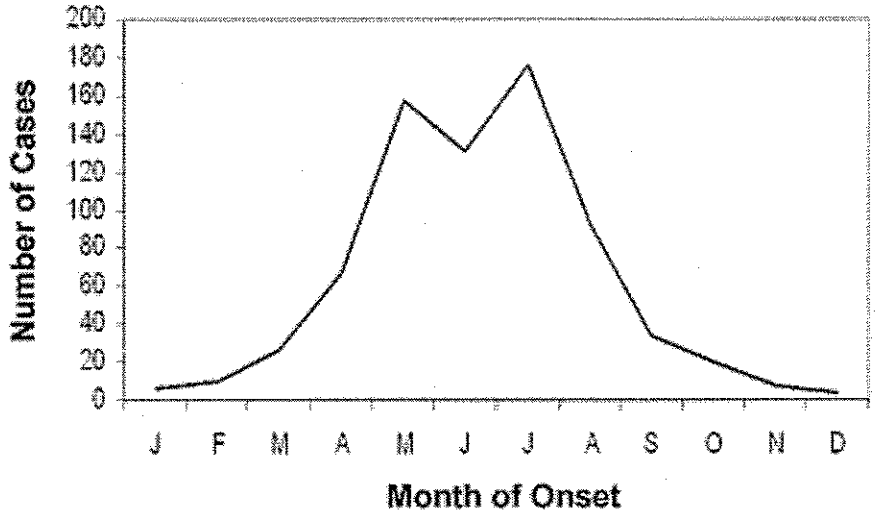
Annual incidence per million population for Rocky Mountain spotted fever by state in the United States for 2002, as determined on the basis of cases reported to the National Electronic Telecommunications System for Surveillance. Source: Centers For Disease Control and Prevention[1]

As a result, when members of a Southwestern Native American Tribe experienced two fatalities in 2003 and 2004[4], few individuals suspected RMSF as the cause. After reviewing the patient data, physicians hypothesized the cause may be RMSF related and requested the assistance of the Centers for Disease Control and Prevention (CDC) and the State Department of Health Services, Vector Borne and Zoonotic Disease Section. Continued is a description of the community public health response to prevent future disease spread as well as fatalities related to RMSF.

Methods

The CDC coordinated an Epidemic Intelligence Service (EIS) Officer based in Atlanta, Georgia to provide assistance to local public health officials to better understand the vector of RMSF as well as methods of preventing the spread of RMSF among the Tribal population. An EIS Officer is a highly qualified professional who, deploys to a field site and performs traditional public health activities such as, data collection, partnering with local health officials, specimen analysis, data analysis, and public education to investigate and address disease epidemics. The EIS Officer traveled to the affected tribe's reservation in September of 2003 to conduct chart reviews, interviews of family members related to a fatality case, evaluations of the home, surrounding environment, and pets that were in contact with the fatality, and meet with local public health officials that were involved in the case investigation. As denoted in chart 1, throughout the United States the tick season is typically characterized as occurring from April to September in a calendar year and the largest numbers of cases occur during summer months. However, locally, Tribal members have presented symptoms later in the tick season, mostly in September.

Chart 1- U.S. Tick Season



Total number of Rocky Mountain spotted fever cases by month of onset during 2002, as determined on the basis of case report forms submitted by the states to the Centers for Disease Control and Prevention.
Source: Centers For Disease Control and Prevention[1]

The second fatality case was determined through laboratory analyses of blood specimens after the fatality occurred prior to the EIS Officer investigation. As a result of the field visits from the EIS Officer in 2003, laboratory diagnoses, and additional RMSF cases in 2004, additional partners became involved including personnel from the State Department of Health Services, and several Federal agencies.

Tick collection activities occurred several times with various State Health Department, CDC, Tribal, and IHS personnel in 2004 and 2005. Typical methods for assessing tick presence in the local environment were used. One method involves dragging a light colored cloth, preferably white, through likely tick habitat such as, tall grass, along streambeds, animal trails, or other areas where animals that typically harbor ticks may frequent. A second assessment involved trapping small rodents such as squirrels, mice, or rats in live traps in the wild to check for the presence of ticks. Both of these methods yielded few results most likely due to the rural areas being sampled. The trapping technique that yielded the best results included placing a small amount of dry ice in a plastic container with holes punched

in the container to allow the carbon dioxide to dissipate throughout the local area. The container was then placed on a white cloth on the ground near homes where ticks are likely to frequent. By using this dry ice technique, several thousand ticks were collected. A surprising result was the collection of a tick species, *Rhipicephalus sanguineus,* or brown dog tick, which had been identified in North America, but had not been previously identified as transmitting RMSF to humans in North America. Through the tick collection and CDC analysis efforts, a positive link established the *R. sanguineus* species as a new carrier and potential vector for human illness[5], which was a significant finding. The EIS Officer developed a proposal in 2004 to reduce the likelihood of future RMSF related illness which included the following components: community education efforts, a coordinated community clean-up campaign to remove items dogs frequently lay on, treating infested home environments with effective pesticides, treatment of dogs with effective tick collars, and development of an animal control program to address stray dog issues.

When describing each of the components it should be understood that the proposal also included details for assigning an individual employed through a Tribal program to coordinate each of these components. The RMSF Coordinator position was to be funded via a one-time fund transfer of $30,000 from the CDC to the affected Tribe. Ideally, the funding should have been transferred to the tribe by February 2005. As of October 2005 the funding had not been transferred due to inter-governmental difficulties. Also, the RMSF Coordinator position was filled temporarily by an Indian Health Service (IHS) Environmental Health Officer (EHO) who was able to address the goals outlined in the RMSF proposal by collaborating with various partners from the Tribe affected, State Health Departments, CDC, USDA-APHIS (Animal and Plant Health Inspection Service), Bureau of Indian Affairs (BIA), IHS, and a nationally recognized, professional pest extermination company and a local Tribal member owned pest extermination company. The greatest contributor to the intervention

involved Tribal Departments including: the Division of Health Programs-Community Health Representatives (CHR) and Health Education. Other Tribal organizations contributed significantly to the intervention including the Tribally owned and operated radio station, and newspaper, Housing Authority, Public Works, Landfill, and several Tribal community members.

Program Plan

As described above, the program plan developed to promote the reduction of future RMSF cases among Tribal community members involved five main components: community education efforts, community clean-up campaign, treating home environments with pesticides, applying tick collars to dogs, and development of an animal control program to address stray dog issues. The design, explanation, and implementation of these components is described under the "Discussion" section.

The program plan was presented to Tribal, State and Federal partners during an intervention development meeting in January of 2005. Partners present at the meeting endorsed the program plan and recommended the Tribal Council review the plan for approval and endorsement. While the Tribal Council did adopt the RMSF program plan for implementation, specific roles and responsibilities were not outlined at that time. Intervention partners developed and implemented work plans to address program plan components. Please refer to Appendix A for the proposed intervention timeline and Appendix B for intervention partners' roles and responsibilities.

Discussion

The Southwestern Native American Tribe described above adopted the proposal developed by the CDC EIS Officer. The program plan components are described below. The program plan provided recommended activities for the intervention partners. The implementation of the program plan components depended entirely on the commitment and

design of the intervention partners.

1) Community Education

Community education efforts were designed to provide information to community members regarding symptoms of RMSF, tick prevention, proper tick removal, and identifying ticks, which were previously unfamiliar to most community members. Additional education efforts included promoting additional program plan components such as, conducting a community clean-up campaign to remove items that might be infested with ticks on which dogs sleep, the treatment of infested home environments with effective acaracides or pesticides to kill ticks, treatment of dogs with effective tick collars, and development of an animal control program to address stray dog issues.

Numerous partnering agencies and individuals have contributed to the overall effort of understanding the community needs for preventing additional RMSF cases. Prior to 2005, a second EIS Officer based in Albuquerque, New Mexico assisted in the development of community surveys to measure the current level of understanding of RMSF among Tribal members. The survey questionnaires were administered in popular public locations with the assistance of local Tribal CHR's who were fluent in the local native language for those individuals, which learned English as a second language. The results of the community surveys indicated that general knowledge about ticks and RMSF was lacking. Some community members could not identify a tick or were unaware that a tick transmitted RMSF.

In 2004, IHS Environmental Health Officers conducted community presentations to interested members of the community including Tribal Council members, community elders, parents of local schoolchildren, Tribal Housing Authority residents, and the general public. During 2005, numerous community members exhibited an interest for RMSF information beyond what had been provided in the previous year. Newspaper articles,

community presentations, and pamphlet handouts were provided in mass distribution via the intervention partners. The numerous handouts were developed as a collaborative effort between the Department of Health Services, Tribal Health Education, and CDC in the form of designing and distributing the posters and pamphlets. The Department of Health Services was able to fund printing costs due to state emergency health funds, and CDC contributed as well.

Some challenges of the education component included: developing educational materials that were easily understood by a wide range of community member literacy levels while containing essential information components, multiple agencies and departments developing separate messages, which led to difficulty in understanding the most current version or its' source, mass distribution of information in a rural setting in a timely manner, and reporting up-to-date information as to the progress of all the teams involved including: clean-up activities, pesticide spraying, and collaring dogs with tick collars.

Community education remains the most sustainable component of the RMSF Program Plan. Additionally, numerous Tribal members indicated that they had witnessed ticks on dogs, horses, and a few on cats, but had never observed ticks otherwise. Despite the nature of the specific tick species involved favoring dogs, several community members including the two fatalities, presented ticks attached to their bodies when visiting the emergency room at the IHS hospital.

Additional education efforts will be conducted in the future to remind community members of the continuing threat of RMSF locally. It is not expected that the tick vector will ever be completely eliminated from the local environment. Given this scenario, in order to reduce the likelihood of future RMSF cases, community members must obtain a familiarity with ticks to ensure that appropriate prevention and removal techniques are followed as well as immediate medical treatment upon recognizing symptoms of RMSF.

Community Education Lessons Learned

During 2005, many departments developed and distributed their own versions of the information they thought was important. Towards the end of the intervention period, a binder of compiled information was developed for all intervention partners. However, a coordinated effort to bring all interested parties to the planning table should have been organized early in the intervention process and consideration should have been given to developing one unified message that was consistent among all the partners. With the various messages that were distributed, confusion was promoted and to some extent, community members were worn out on the issue given that similar messages were presented on the same topic, but few if any provided additional information in new pamphlets. Also, there were missed opportunities to accomplish several components of the program plan simultaneously. During the implementation of each program plan component, intervention partners would invariably note these missed opportunities. Denoting these observations during debriefing sessions, compiling and reporting the information would have been helpful for activities that will occur in the future.

2) Community Clean-Up

The community clean-up campaign involved removing items outside homes on which dogs frequently sleep such as mattresses, couches, or upholstered chairs. These items are most frequently placed outside homes under shady areas or porches for relaxation purposes particularly during evenings. Community members were requested via Tribal radio, newspaper, and community advertisements to stack items for removal at the end of their driveway. Communities were surveyed and prioritized based on the amount of items identified for removal. A CDC philanthropic organization, "The Watsonian Society", which is composed of CDC Public Health Advisors, provided twelve individuals for a two-week period to remove items from the community and transport them to the Tribal landfill.

These twelve individuals utilized vehicles provided by the USDA-APHIS organization and partnered with Tribal members and Tribal CHR employees.

The removal of items dogs normally sleep on around community members homes was an immense task and several challenges were present including: 1) The Tribal landfill nearing its' capacity, which prompted Tribal Landfill and Public Works officials to be initially reluctant to allow the disposal of an enormous amount of refuse in a short period at the Tribal landfill. 2) A large number of Tribal members do not have sufficient funding or transportation to transfer these items themselves to the Tribal landfill. 3) Typically, the items that were removed had been there for a lengthy period and some difficulty was experienced removing items stuck in the ground, or when snakes, rats, or other animals were harboring inside the refuse. 4) A large number of community members requested items be removed that were not on the disposal list such as, washers and dryers, scraps of wood, and other general refuse. Overall, a large number of mattresses, couches, carpets, and other items dogs frequently lay on were removed from the surrounding home environment.

Another challenge related to community clean-up was the Tribal radio and newspaper advertisement of scheduled activities of clean-up teams to community members. Community members were requested to stack appropriate items for removal at the end of their driveways. The clean-up teams would then drive along the road and load their trucks and trailers and haul the loads to the Tribal landfill. The amount of time required to drive round trip from each community to the landfill and back significantly reduced the amount of work that could have been accomplished. Large roll-off bins were requested to be placed in various communities to serve as depositing substations, but given the lack of funds to pay for their rental and disposal and the Tribal Landfill requirement to sort refuse, the roll-off bins were not utilized. Several community members reported complying with the requirement of stacking items at the end of their driveways, but their items

were not removed. Missing a few homes in a community illustrated one of the difficulties of maintaining clean-up schedules. Items would be removed in a community, the clean-up crew would move to a new community and community members from the previous community would report that they weren't able to comply with the clean-up schedule and would request clean-up crews visit their homes again. Occasionally, second visits could be accomplished, but in most cases, clean-up crews were forced to continue with their schedule rather than fall behind. The period between the public becoming informed of the clean-up schedule, and the community member stacking items at the end of their driveway was often poorly timed with the clean-up teams schedule. Unfortunately, the clean-up teams could not predict when they would complete activities in one community and move to the next one. This lack of coordination was frustrating for the intervention partners and the public.

Community Cleanup Lessons Learned

A major improvement of the clean-up plan was that an organized schedule with built-in time buffers should have been developed and distributed throughout the communities several weeks to a month prior to the clean-up crews arriving. Weekly reminders and contests promoting the cleanest yard could have provided incentives for participation. Also, coordinating additional clean-up crews would have been helpful. Potentially, community members could have assisted in transporting refuse to the landfill or assisting other community members that may have been physically unable to pile their own refuse. However, the Tribal Landfill rarely allows private vehicles to drive onto the property and dispose of waste. Another issue was addressing the concerns from Tribal Public Works and Landfill employees that the landfill was filling quicker than staff could complete daily sorting and dirt fill requirements. Additional staff could have been assigned to assist in these activities at the landfill so the Landfill employees could maintain their required maintenance obligations.

3) Home Pesticide Treatment

Applying effective pesticides to kill adult ticks and future generations of ticks outside home environments was a third component of the RMSF program plan. One partner for this component involved a nationally known, professional extermination company. The extermination company donated personnel, pesticide chemicals, and equipment to the effort of applying pesticide to every home, which totaled 353, in one community where several cases of RMSF were confirmed. The company also conducted on-site training of Tribal community members in proper pesticide application techniques.

Historically, the Tribal Housing Authority or the homeowners themselves have conducted pesticide application around community member's homes. Applying pesticide to several thousand homes in such a short period had not been accomplished or attempted in the recent past. Typically, the types of pesticides homeowners apply locally are designed to eliminate other pests such as roaches, rodents, ants, etc. Several phases of pesticide application were conducted.

The first phase involved the professional extermination company applying pesticide to all 353 homes in one community in a four-day period. During the four-day period, several Tribal community members were trained on properly applying pesticide through supervision of extermination professionals. The onsite training encouraged several of the community members to request a training opportunity to become certified pesticide exterminators. The Indian Health Service contracted with a private company to train and test Tribal members to become certified pesticide exterminators. Several individuals from the original group became certified pesticide exterminators and one joined a newly formed extermination company owned by Tribal members. The national, professional company also donated enough pesticide chemical for an additional 1000 doses.

The second phase was initiated shortly after the first and involved three pesticide applications to Tribal Housing Authority rental units in targeted

communities by an additional pesticide company. The Tribal Housing Authority pesticide contract involved each of its' rental homes, which numbered close to 2000 homes. The Tribal Housing Authority scheduled two pesticide applications to coincide with the tick season and a third to occur during the spring of 2006.

The third phase, which occurred simultaneously with Tribal Housing Authority, efforts involved three teams each composed of a Tribal CHR employee and an IHS EHO. Each team was tasked with evaluating homes in multiple communities for the presence of ticks. A rating sheet was developed and priorities were established based on the visual identification of ticks, presence of dogs, presence of tick habitat, residents reporting regular presence of stray dogs, and several other criteria as noted in Appendix C. Based on the survey results, granular pesticide was applied around the home to serve as a barrier. The homeowner was provided: a demonstration of the product, proper method of wetting and activating the product, information on effective pesticides that may be purchased locally, and instruction on prevention techniques to reduce tick bites and RMSF transmission. The three IHS/CHR teams visited 500 homes and applied granular product to approximately 57% of the homes during three weeks.

The application of pesticides to areas around community member's homes was met with several challenges. Concerns were raised regarding a homeowners desire to not have pesticide chemicals applied to their yard. The issue was discussed with RMSF partners and was proposed to the Tribal Council. It was decided that safety information regarding the chemicals applied to community member's yards would be disseminated to each home. Additionally, while the chemical did pose minor concerns during application, few if any concerns were present after the chemical dries. In the Southwestern arid climate experienced on the reservation, the chemical dried very quickly.

Additionally, the granular product was required to be sprayed with water after it was distributed on the ground around community member's homes.

The CHR/EHO teams carried water hoses with them to each home and requested the use of the homeowner's water faucets to moisten the granular product. Some homeowners were very enthusiastic to receive free pesticide services and indicated they would moisten the granules themselves. Some further indicated they wanted to purchase additional products and showed a continued interest in killing any ticks present at their homes. Maintaining pesticide-spraying schedules for each of the pesticide application phases was also difficult.

Home Pesticide Treatment Lessons Learned

The large majority of community members supported spraying chemicals around their home to kill ticks. The most frequent request was for information that detailed products community members could purchase themselves. Understanding what products would be effective was the greatest concern among community members. Please refer to Appendix F for an example of a pesticide pamphlet. The greatest concern from intervention partners was related to the health and safety of the community members regarding pesticide application around each of the homes.

Ensuring the animal control component was addressed early in the intervention should have been simultaneous with the home pesticide treatment component. A professional pesticide expert can apply pesticide at a home, but if stray dogs continue to frequent the area, once the pesticide has dissipated from the environment the homeowner will again be at risk from tick exposure.

4) Dog Tick Collar Distribution

Dogs on the reservation primarily serve the purpose of guarding the house or property of community members. A few animals are kept as pets, but the majority roams free and likely claim several community members as their owner. Applying tick collars to dogs was an effort to kill mature ticks that were feeding on dogs. Numerous stray dogs served as a transport

vehicle providing ticks access to various communities that may not have experienced tick infestations previously.

The CDC and State Department of Health Services contributed to the purchasing of tick collars. The tick collars currently available were found to be effective, long lasting, and according to the manufacturer maintained a long shelf life.

Partnering with USDA-APHIS staff and Tribal members provided a capable and enduring group of people who walked through communities and attracted dogs to them. After the dogs were attracted to the collaring teams, tick collars were placed on the animals.

Collaring dogs with tick collars was similar to the clean-up campaign in that it was a labor intensive component, but the dog collaring presented its' own unique set of challenges, such as the lack of familiarity of the teams with the animals, local knowledge of the communities, and areas where dogs frequently reside. Approximately 3000 tick collars were either provided to community members to collar their own animals, or the collaring teams were able to collar dogs. The large majority of the 3000 collars consisted of the collaring teams applying the collars themselves. Each team consisted of either a State Department of Health Services Veterinarian, Army Veterinarian or a USDA-APHIS wildlife biologist and local Tribal members. Each team canvassed entire neighborhoods and communities by walking down roads and attracting dogs with treats, or with the assistance of the dog owners, wrestling the dogs while a tick collar was placed around its' head. The skills and abilities of the veterinarians and wildlife biologists combined with the local knowledge of Tribal community members ensured a thorough distribution of tick collars throughout the reservation. The dog collaring efforts were a high priority given the transient nature of stray dogs and the lack of pet care that occurs among the large majority of dogs on the reservation. Numerous owners requested tick collars and it is anticipated that requests will be frequent next year as well. No resources have been currently identified for purchasing additional

tick collars.

Dog Tick Collar Distribution Lessons Learned

It is difficult to adequately describe the challenges presented to the collaring teams. The collaring teams required committed, energetic, fearless individuals who were willing to approach unfamiliar animals with no hesitation. Increasing the team size for the tick collar teams to three instead of two individuals would have assisted in record keeping, supply management, and corralling dogs. Developing an educational component that better described what actions community members can take after the efficacy of the tick collar has worn off would also have been useful.

5) Animal Control Program

The program plan detailed development of an animal control program to address stray dog issues. As described above, reducing the stray dog population is vital to the effort to reduce RMSF prevalence in the Tribal community. As of the development of this document, the Tribal Division of Health Programs (DHP) has initiated an animal control program by hiring an animal control officer and purchasing equipment related to the position requirements. The Tribal DHP has requested that the Tribal Council provide funding for the program after April of 2006. The animal control program plan includes the capture, detainment, and potential return of stray dogs to their owners via a service fee. If the owner does not claim the animal within a given period, the animal will be euthanized.

Historically, the Tribal Police Department, administered a domestic animal control program for the reservation however, this program had difficulty operating effectively given its' limited budget. Currently, community members consistently request animal control services from several Tribal and non-Tribal departments, but rarely present these requests publicly to their elected Tribal officials regarding the need for stray dog removal, enforcement of aggressive animals, or simply removing dead

animal carcasses from roadways.

The large number of stray animals encourages the migration of ticks throughout various communities. Education regarding the need for community members to discourage stray dogs from sleeping near their homes, or children playing with strays is needed. Also, a better understanding related to restraining animals in a fenced yard or using a chain or rope should be encouraged among Tribal members. The domestic animal control program was non-existent for several years prior to 2005. Historically, when in operation, the animal control officer had removed approximately 30 animals and as many as 50 monthly from the reservation.

The Tribal DHP proposal to provide funding to re-initiate the animal control program, which had previously consisted of a position at the Tribal Police Department and little infrastructure, will assist in the removal of stray animals from the reservation, which should discourage the spread of ticks to neighboring communities.

Animal Control Program Lessons Learned

Historically, the animal control program had been staffed sporadically. Due to some Tribal members traditional Native American beliefs, finding an individual that would be willing to euthanize dogs proved to be a challenge. Local communities bordering the reservation would not provide euthanization services free of charge and transport to the facilities was problematic as well. A well-established animal control program that promoted components of stray dog removal from communities was needed early in the intervention. Each of the program plan components will reduce the likelihood of future RMSF cases in the Tribal communities. However, the animal control program is one of the most crucial components due to the large number of stray dogs on the reservation and the connection between the RMSF tick vector and the dog population. If intervention partners, including the Tribal Council, do not support and maintain an effective animal control program, the risk of RMSF could reach similar

levels present prior to 2005.

Additional Resources

During the program implementation phase several summer college students were utilized as interns from the Tribal CHR program, Native American Research Centers for Health, and IHS. The college students were very flexible, had a strong desire to do well, and provided high energy levels in their surrounding environment. This type of temporary resource provide invaluable as the college students could accomplish a variety of tasks in a short period. Some educational materials including public service announcements, pamphlets, and calendar/coloring books were developed solely by the college students and approved by intervention partners. Future interventions should utilize and empower a similar workforce to address multiple tasks in a short period.

Conclusions

The RMSF program plan listed five important components that were developed. By implementing each of the program plan components to the greatest extent possible, the effort to reduce tick populations, increase community awareness, and ultimately protect a population from a previously unknown threat was successfully accomplished. Collaborating with the various Federal, State, and most importantly, Tribal Departments ensured that intended project activities were successfully accomplished. Future activities related to community education, residential clean-up, and home pesticide treatment will be necessary, but the most important component of all will be the need for a continued animal control program to reduce the likelihood that dogs will transfer the tick vector throughout the reservation.

Continuing to promote each of the components described is essential to maintaining an effective attack against RMSF in this Tribal community. Due to funding constraints, it is expected that the large-scale effort that occurred

during the five-month period from January to August of 2005 would be difficult to replicate in subsequent years. However, an effective effort to reduce future disease rates can be maintained by maintaining community interest in addressing each of these components.

A similar effort of the same magnitude may not be necessary in the future. Active participation in similar intervention activities among community members is needed more consistently in the future. Communities in Oklahoma and North Carolina experience regular RMSF cases yearly and are able to identify ticks, receive medical treatment for tick bites, and survive tick bites. I am confident that this Tribal community will also be able to reach a similar level of awareness.

Appendix A

Rocky Mountain Spotted Fever Community Intervention Components

Proposed 2005 Activities

Intervention Component	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Community Education												
-Conduct community knowledge surveys	Fall 2004											
-Determine community knowledge needs	Fall 2004											
-Develop educational materials based on established needs												
-Publicize radio PSAs, newspaper articles												
-Distribute door-to-door handouts in communities												
-Conduct community presentations												
-Develop new products based on future knowledge deficiencies												

Intervention Component	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Community Clean-up												
-Prioritize communities based on refuse amount												
-Coordinate Public Works/Landfill payment												
-Develop clean-up teams and schedule												
-Publicize clean-up schedule												
-Conduct clean-up activities												
Home Pesticide Treatment												
-Develop home assessment form to prioritize homes												
-Coordinate Tribal member pesticide training												
-Develop & publicize spraying schedule for professional company												
-Conduct door-to-door pesticide application												

Intervention Component	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dog Collaring												
-Identify effective collars												
-Develop teams & schedule												
-Publicize collaring schedule												
-Conduct dog collaring												
Animal Control Program												
-Research funding & training opportunities												
-Advertise position												
-Hire Animal Control Officer												
Evaluation												
-Conduct field visits during program component procedures												
-Conduct interviews with Intervention partners												
-Develop summary of intervention activities and distribute to partners												

Appendix B

INTERVENTION PARTNERS' ROLES AND RESPONSIBILITIES

Contributing Departments	Intervention Components	Community Education	Community Clean-up	Home Pesticide Treatment	Dog Collaring	Animal Control
	Tribal Div. of Health Prgms.					
	Tribal Community Health Rep.					
	Tribal Health Education					
	Tribal Housing Authority					
	Tribal Legal Dept.					
	Indian Health Service					
	CDC- EIS Officers (3)					
	Other CDC Personnel					
	Tribal/IHS Summer Interns					
	Tribal radio station/newspaper					
	Tribal Environmental Svcs.					
	Tribal Landfill					
	Bureau of Indian Affairs					
	Tribal Public Works					

Contributing Departments / Intervention Components	Community Education	Community Clean-up	Home Pesticide Treatment	Dog Collaring	Animal Control
Tribal Pesticide Company					
National Pesticide Company					
State Health Veterinarians					
U.S. Army Veterinarians					
Animal Shelter volunteers					
Tribal Contract Employees					
State Dept. Health Services					

Appendix C- Form used during the IHS community surveys

Home Risk Assessment for

Tick Habitat and Rocky Mountain Spotted Fever, 2005

Completed by _____ Date conducted _____ Record number ____

Community _____ Neighborhood/Housing Area _____

Street name _____ House number (red 911 #) _____

Structure type: Site built Modular (double wide) Single wide trailer Other_____

Housing Authority jurisdiction house? Y N

Any previous probable/confirmed RMSF case from this home?		Y	N
Ticks present under/near the House:	▪ reported by resident?	Y	N
	▪ observed during visit?	Y	N
	▪ reported by others (CHR, PHN, etc.)?	Y	N
Ticks present inside the house?		Y	N
Tick infestation on dog(s) at home?		Y	N

(Note: any "yes" answer = High Risk)

Presence of risk factors: (each yes answer is assigned a weighted point value)

▪ routine presence of dog(s) at home?	Y-6	N	▪ excess trash/junk near house?	Y-6	N
▪ elevated (not skirted) house?	Y-4	N	▪ elevated/open porch?	Y-4	N
▪ mattress(s)/upholstered furniture under/near house, or on porch	Y-4	N	▪ firewood, other items stored under house or porch?	Y-4	N
▪ untrimmed grass/weeds near house?	Y-2	N	▪ water leaks/standing water near house?	Y-2	N

▪ other _____

(Note: for these risk factors, summed points of 10+ = High Risk; 5 to 9 = Medium Risk; 0 to 4 = Low Risk)

Resident present during assessment? Y N

Risk assessment summary discussed with resident? Y N

Written prevention or risk information:

- given to resident? Y N
- left at the house? Y N

Pesticide applied to exterior of house? Y N if yes, type = granule spray other_____

Dog treatment provided: - to resident to apply: collar (# given_____) frontline (# given_____)

- applied at time of visit: collar (# applied_____) frontline (# applied_____)

Any referrals made as a result of this home assessment?

If yes, for what and to whom?_____

FINAL RISK CATEGORY: HIGH MEDIUM LOW

(RMSF Home Risk Assessment form ver. 4)

Appendix D

Example of PSAs that were aired during the intervention

Tribal Radio Station, could you please announce the information below on the radio several times Monday, April 25, and especially Tuesday April 26?

We are trying to get a tick collar on every dog in "Y Community" and ultimately the entire reservation. Thank you for your continued support.

Sincerely,

Jeff Dickson
IHS-OEHE

In Y Community on Monday afternoon April 25, there will be a team of veterinarians going door-to-door to put tick collars on dogs! They will not be able to put collars on mean dogs or stray dogs that won't cooperate. Please help us put a tick collar on every dog in "Y Community" by restraining your dog at home on a leash or inside your fence. We appreciate any help you can give by holding your dogs when we put the collar on.

On April 26, there will be a Dog Collaring Clinic in "Y Community" where you can bring your dog to the following locations:

9:00 to 10:00 Upper Bridge

10:00 to 12:00 Tire Shop

1:00 to 2:00 Main Bridge

2:00 to 4:00 "Y Community" Complex

If you have any questions please call the Office of Environmental Health at XXX-XXXX.

Appendix E

Newspaper articles that were published locally

Off-Reservation Newspaper

01/28/2005

Rocky Mountain Spotted Fever found in dog ticks

X Community - The war against Rocky Mountain Spotted Fever and the ticks that carry it has begun in X Community. It is not a disease to take lightly. Until the late 1940s as many as 30 percent of those infected died. In spite of advances in medicine, from 3-5 percent of individuals with the disease still die from it. Children, who spend more time playing outdoors than adults, often with dogs, are the most vulnerable.

This past year scientists with the U.S. Centers for Disease Control and Prevention discovered that RMSF on X Community is being transmitted through Brown dog ticks, not previously known to carry the disease. Prior to 2003 no cases of RMSF were reported in the eastern part of the state. In the past two years there have been 14 confirmed cases of RMSF on the X Community, with two deaths. That is 300 times the national average. Just as alarming, one in 10 ticks collected in some areas have tested positive for RMSF. The area with the greatest tick infestation is the area hardest hit by the Y Community Fire. No one knows the exact cause of the epidemic, but one fact stands out - nature's balance was changed by the fire.

At a consortium of federal, state and tribal health and environmental leaders in X Community Jan. 25, William Nicholson, the world's foremost authority on ticks, said, "Dog population control is essential to preventing the disease, as well as generalized yard cleanup." Williams is head of the Viral and Rickettsial Zoonoses Branch of the U.S. Centers for Disease Control and Prevention (CDC). He stressed that it is essential that steps are taken to prevent another epidemic in 2005. He said, "A little problem can become a big problem quickly." Clean-up has been ongoing in communities the past two years, and plans are being laid to spray targeted areas with pesticide beginning in April. Williams said, "Ticks are focused in certain areas. We need to target shady places where dogs lie."

In addition to spraying tick habitat, stray dogs need to be picked up, and people need to make sure their pets are protected against fleas and ticks. The recommended treatment is Frontline or similar products that are applied between the animal's shoulder blades.

Getting rid of places and objects on which ticks collect is a top priority for residents. That means disposing of old mattresses, furniture and blankets around houses. Any dark damp place can provide ticks with a home. Crawl spaces under unskirted houses and trailers, and dog houses are favorite tick

habitats.

Tribal Council member and Chairman of the Tribal Health Board said, "It's scary to be highlighted in the country for having a new strain of ticks that carry the disease."

She said, "We've been getting the word out to people since June 2003. We were all brought together when a child died . . . The IHS (Indian Health Service) has been keeping us informed."

The death of a 14-month-old baby from RMSF brought the CDC to X Community and Y Community to investigate in 2003. They collected information about the cases and conducted tick surveys. They didn't find any Dermacentor ticks, the kind that usually transmit RMSF. They did find a lot of Brown dog ticks.

In the summer of 2004 an additional 13 cases of RMSF were reported and confirmed, including the death of a 5-year-old child. The CDC came to assist the Tribe in June. Their mission was threefold: to educate doctors in the region to recognize RMSF, to improve community awareness of ticks and to collect ticks from across the reservation.

More than 2,000 Brown dog ticks were collected from dogs and from areas around patients' houses. The ticks were tested in the CDC labs. Up to 10 percent of the ticks were found to carry the agent of RMSF, Rickettsia rickettsii, a species of bacteria.

Officials from the Indian Health Service and CDC, as well as the Tribe and Bureau of Indian Affairs are mobilizing their resources to put a plan into effect this spring. They propose to continue community educational programs, have community clean-up days, develop a strong animal control program, treat homes and dogs for ticks and consider a long-term pest control program.

Community meetings are being scheduled throughout the reservation to plan how to deal with the problem. The Chairman of the Tribal Health Board said, "Our focus should be 'This is going to save lives, so let's continue to work on it.' Clean-up has to be a constant campaign. It has to be a community effort."

Indian Health Service officials reminded the group of the possible rapid spread of the disease. "This is a unique situation right now that could become a very common situation. We are becoming the experts. If it becomes problematic in other places, they are going to be looking to us for advice."

Tribally owned and operated newspaper article

NEWS RELEASE

FOR IMMEDIATE RELEASE

Tribal Editor

Tribal Newspaper

X Community, AZ

(XXX) XXX-XXXX

X Tribe Fights Back Against Rocky Mountain Spotted Fever

(May 2005, X Community) A massive effort is underway throughout reservation communities in response to a recent outbreak of Rocky Mountain Spotted Fever (RMSF), an illness that occurs after people are bitten by infected ticks. The X Tribe and other partnering agencies are intervening to control tick infestations among community dogs and in the environment where dogs are likely to be found.

Intervention efforts include a comprehensive community cleanup campaign, the distribution of over 3000 tick-repelling dog collars, pesticide application around homes, and community education. Every reservation community will ultimately be addressed by the intervention that began in Y Community and moved steadily east towards X Community and then into W Community and Z Community.

Community Health Representatives, the Tribal Health Education Department, the Native American Research Center for Health (NARCH), Public Works, and the Housing Authority all provided tribal leadership, representation, and resources critical to the intervention's success thus far. The CHRs and Indian Health Service guided partners from the Centers for Disease Control and Prevention (CDC), Department of Health and Human Services (AZDHS), the

United States Dept. of Agriculture (USDA) Animal and Plant Health and Inspection Service (APHIS), Pest Control Companies, the Humane Society volunteers, and a U.S. Army Veterinary support group through the reservation to perform services. Within these groups was the Watsonian Society, a CDC-sponsored service organization for public health, who brought out 12 public health officials over a two-week period to provide support and labor especially for the clean-up campaign.

With the X Tribe providing essential leadership to the program, government agencies have provided assistance as requested. The cooperation among the Tribe and numerous large agencies and organizations has been a program strength that reflects months of hard work and planning efforts that preceded the intervention.

The, CHR Director, X Tribe, indicated, "Community involvement will be critical to the long-term success of this intervention. Community members will make a significant impact as they continue to reduce tick populations in and around their homes by applying pesticides inside and outside of the home, removing debris around the homes such as old couches and mattresses, keeping dogs collared, and checking children daily for ticks". These measures, which can be done by each homeowner, will significantly reduce the risk for RMSF for their families. More detailed information concerning what homeowners can do is available from the Community Health Representative and Health Education Departments.

Rocky Mountain Spotted Fever, caused by a bacteria from a tick bite, is a severe and sometimes fatal disease. The X Tribe has experienced an epidemic of RMSF the past two years, with rates in children over 500 times higher than the national rate. Last year's outbreak investigation showed that the tick spreading

the disease on the reservation is the brown dog tick, an unprecedented finding in the United States, which is apparently being carried to people by dogs. If you have questions about Rocky Mountain Spotted Fever, please call the CHR program, Health Education, or IHS-OEHE.

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3. Arizona Department of Health Services website, Vital Statistics Annual Reports; http://www.azdhs.gov/plan/report/ahs/ accessed on 9-12-05.

4. MMWR. Fatal Cases of Rocky Mountain Spotted Fever in Family Clusters --- Three States, 2003. Volume 53/No. 19, May 21, 2004

5. Demma, L, Traeger, M, Nicholson, W, Paddock, C, Blau, D, Eremeeva, M, Dasch, G, Levin, M, Singleton, J, Zaki, S, Cheek, J, Swerdlow, D, and McQuiston, J. Rocky Mountain Spotted Fever from an Unexpected Tick Vector in Arizona. New England Journal of Medicine 2005;Vol. 353 p. 587-594